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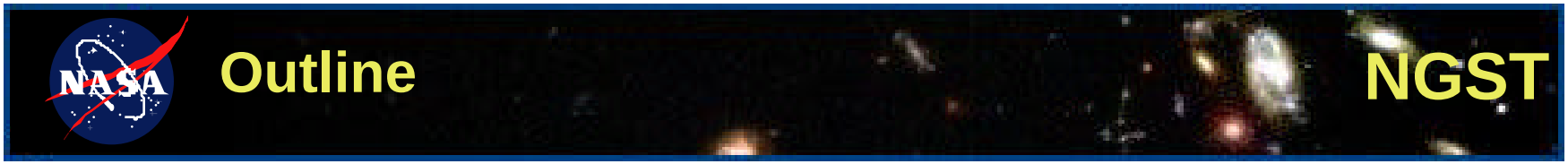
STATUS REPORT

IR Detector Technology Development

Oct 9, 1997

Craig McCreight

ARC



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- **Recent Accomplishments**
  - **InSb**
  - **Si:As IBC**
  - **HgCdTe**
- **Development Status**
  - **Ongoing Projects**
  - **New Activities**
- **Goals for next 4 Months**

Recent Accomplishments

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- **All "primary" NGST development projects were presented at Tech Challenge Review.**
- Large-format InSb arrays (W. Forrest, U Rochester, & SBRC)
  - Develop buttable 1k x 1k arrays, with <3 e- read noise and 0.01 e-/s dark current
  - 1st-year focus on reducing noise, with improved readouts. Identified 2 - 3 leading candidates for lot splits -- modifications of basic unit cell circuit.
- Large-format Si:As impurity band conduction (IBC) arrays (C. McCreight, ARC, & SBRC)
  - Develop 256 x 256 and 1k x 1k arrays, with <3 e- read noise and 0.05/10 e-/s dark current
  - Defined and laid out next generation readout for IBC array: 412 x 512 pixels
- Arrays of HgCdTe (10 μm) for NGST (J. Pipher, U Rochester, & Rockwell)
  - Develop HgCdTe detrs & arrays, T ~ 25-30 K, understand & reduce (~100 e-/s) dark current
  - Recent series of selected arrays, on NICMOS muxes, under test

Si:As Read Noise 6/97 Data

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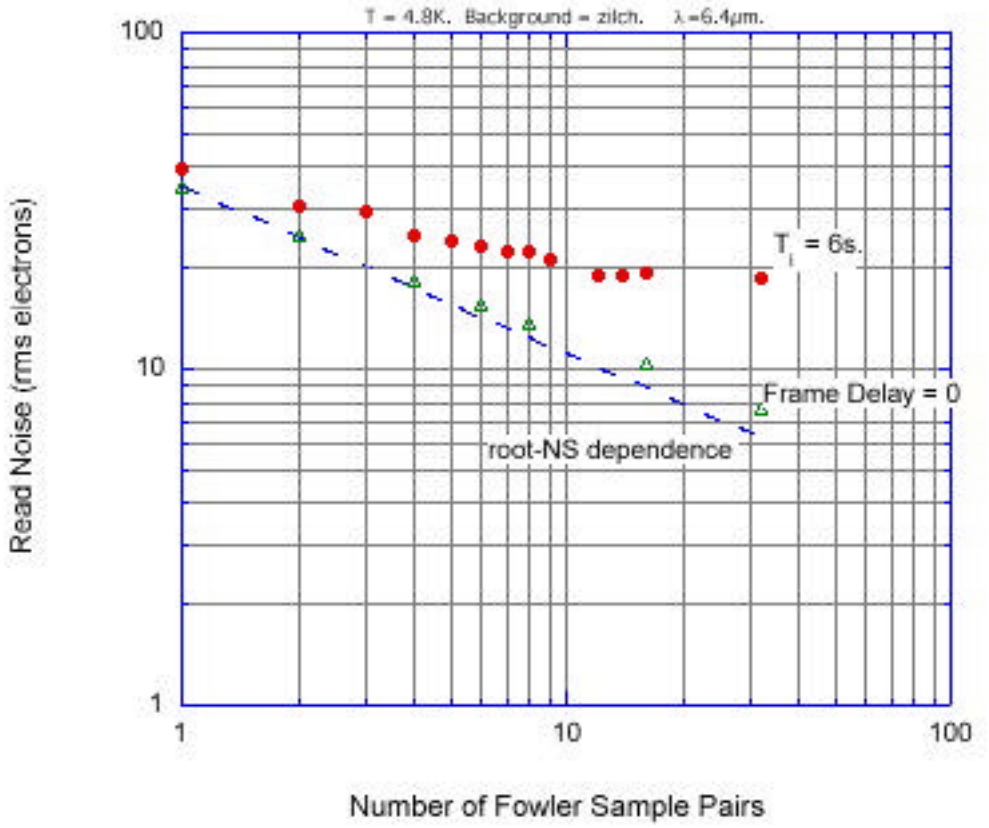

HgCdTe Dark Current Data

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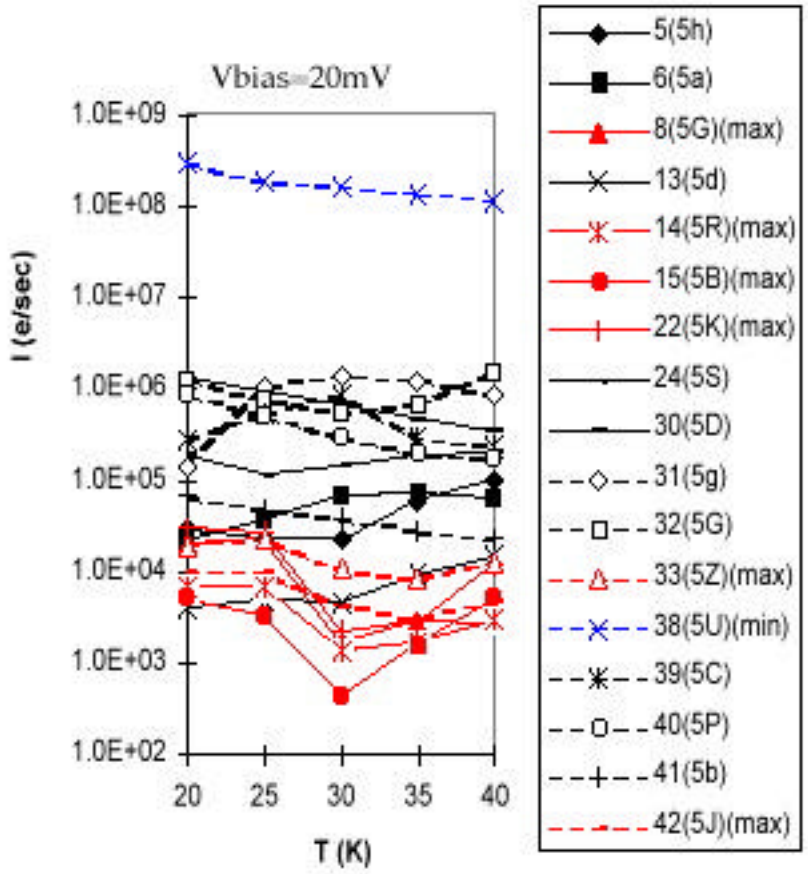

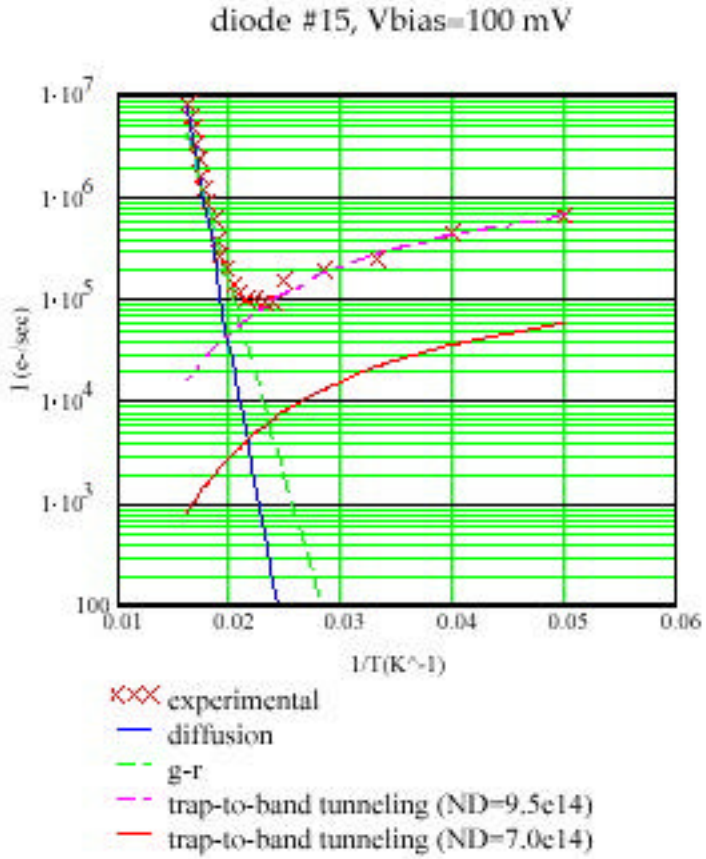

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- Plan definitized at SBRC meeting 8/19. Will save approximately 20% of costs, by combining readout needs for InSb and Si:As IBC projects.
- Builds on CRC-744 readout design. Includes 256 x 256 and 412 x 512 structures.
- Costs shared with SIRTF/IRAC likely, too.
- Masks being fabricated; lot runs imminent.

“Primary” Technologies

- All (InSb for near-IR, Si:As & 10-µm HgCdTe for thermal-IR) funded & rolling

“Backup” Technologies

- Plan to competitively select 1 backup activity for near-IR, and 1 for thermal-IR
- Funding via pooled NGST and Code SM technology resources
- Procurement approach: midrange R&D RFO
- Statements of Work completed in draft form

Goals for Next Four Months

- InSb: Complete analysis, design, & layout of advanced input test circuits. Initiate fabrication.
- Si:As: Complete design & layout of large readout. Start fabrication. Complete fabrication of new IBC material lot.
- HgCdTe: Complete dark current tests on present devices. Initiate fabrication of improved lot.

“Backups”

- RFOs (2) released, under evaluation, anticipating awards ~Feb/Mar.